Ages of Adult Atlantic Salmon Samples from the Dalhousie Trap, Restigouche River System, 1972-80

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ABSTRACT

Pickard, R.P. and J.L. Peppar. 1983. Ages of adult Atlantic salmon samples from the Dalhousie Trap, Restigouche River system, 1972-80. Can. Data Rep. Fish. Aquat. Sci. No. 393. vii + 11 p.

Ages at migration (smoltification and spawning migration) of Atlantic salmon in the Restigouche River, New Brunswick, were obtained from two seasons (1979-80) of scale sampling the ascending adult salmon run. In addition, ages of previously spawned salmon were obtained from nine seasons (1972-80) of scale samples. This report presents the final ages assigned to all the scale samples read.

Key words: Atlantic salmon, smolt, grilse, large salmon, spawning migration, scale sample, freshwater age, sea age, Restigouche River, maiden fish, previously spawned salmon.

RÉSUMÉ

Pickard, P.R. and J.L. Peppar. 1983. Ages of adult Atlantic salmon samples from the Dalhousie Trap, Restigouche River system, 1972-80. Can. Data Rep. Fish. Aquat. Sci. No. 393. vii + 11 p.

On a établi l'âge migratoire (avalaison des tacons et montaison) du saumon atlantique remontant la rivière Restigouche (Nouveau-Brunswick) grâce au prélèvement au cours de deux saisons (1979 à 1980) d'échantillons d'écailles de saumons adultes à la montaison. De plus, les âges de saumons a montaisons multiples on été obtenues pour neuf saisons d'échantillonnage d'écailles (1972-80). Le présent rapport donne les âges définitifs attribués à tous les échantillons prélevés.

INTRODUCTION

This report presents data on the ages at migration (smoltification and spawning migration) of Atlantic salmon in the Restigouche River, New Brunswick. Data were obtained from two seasons of sampling the ascending adult salmon runs to the Restigouche River system, 1979-80; data derived for the period 1972-78 have been previously presented (Peppar and Pickard 1975 and Pickard and Peppar 1979). In addition, this report presents a more detailed breakdown of the ages of previously spawned salmon than had been presented in earlier reports.

Sampling was conducted by means of a stand of four, interconnected, Chaleur Bay, spearhead floating traps, set and operated each year in Chaleur Bay about 315 m south of Bon Ami Rocks, Dalhousie, New Brunswick (48°03'N; 66°21'W). This location was chosen because of its position near the head of the Restigouche River estuary, and its past reputation as a good commercial-fishing trap site (Fig.).

In 1972, both "leaders" and "pounds" of the traps were constructed in 15.2-cm (6-in.) mesh; but, in 1973, a smaller mesh, 8.9 cm (3.5 in.), was used in the pounds to allow capture of both grilse and large-salmon components of the ascending adult run. The mesh size of the inshore pound was further reduced to 6.4 cm (2.5 in.) in 1975.

The sampling operation was conducted by personnel of the Freshwater and Anadromous Division, Fisheries Research Branch, as part of an adult-salmon enumeration and tagging program initiated in 1972. The traps were set and fished by the licensed owner of the stand, J.A. Reid Stewart.

METHODS AND PRESENTATION OF DATA

Ages were determined by scale reading. Scale samples were obtained from all salmon tagged, from those scale sampled only, from those sacrificed for further biological analysis and from those found meshed in the traps. Samples of scales were removed from the left side of each fish, immediately posterior to the base of the dorsal fin and 2-3 scale rows above the lateral line.

Each scale sample was examined under a binocular microscope, and those scales with suitable (entire) centres were subsequently impressed on acetate slides. To read the scales, a microprojector was employed to project the scale image on a white background.

All scale samples were independently read twice; additional readings were made of those samples in which ages disagreed, and final ages were assigned on the basis of majority agreement. Of the 816 scale samples read for Tables 1-6, all (100%) provided suitable centres for determination of freshwater age. Differences in sample sizes recorded in Tables 8-12 and 18-22 reflect the proportion of scales from previously spawned salmon for which smolt ages and/or sea age could not be determined. Of the 275 previously spawned salmon scale samples read, 3 (1.1%) did not provide suitable centres for determination of freshwater age, and 1 (0.4%) was eroded too badly for determination of sea age. As a result of updated corrections (March 1982), Tables 7-12 and 18-22 may also indicate differences in percents and/or in sample sizes of previously spawned salmon from those presented for 1972-78 in earlier reports.

The method used to record data in the first section (Tables 1-6) of this report divides total age into two parts - freshwater (smolt) and sea ages; for example, a fish recorded as "3.2" has spent three years in freshwater and all or part of the succeeding two years in the sea. This is commonly referred to as a "two-sea-winter" salmon. In the previously spawned salmon section (Tables 7-22), total age is divided into three parts - freshwater (smolt) age, sea age and spawning age; for example, a fish recorded as "3.4,2" has spent three years in freshwater and most of the succeeding four years in the sea, except for a previous spawning trip as a "two-sea-winter" salmon.

In presenting the age-composition data, grilse (fish returning to spawn after spending only one winter at sea) and large salmon (fish returning to spawn after spending two or more winters at sea) are treated separately in Tables 1-6. Previously spawned fish are "lumped" in Tables 1 and 7-9, regardless of at what age they spawned or how many times they had previously spawned. In Tables 2 and 10-12, the previously spawned fish have been separated according to their sea age when entering the river for the first time. Tables 13-15 and 16-17 separate the previously spawned fish according to their sea age at second and third previous spawning trip, respectively. In Tables 18 and 19, the respawners have been separated according to their final age with regard to previous spawning marks. Remaining tables (3-6 and 20-22) present final age (i.e., present age) at year of sampling, irregardless of previous spawning.

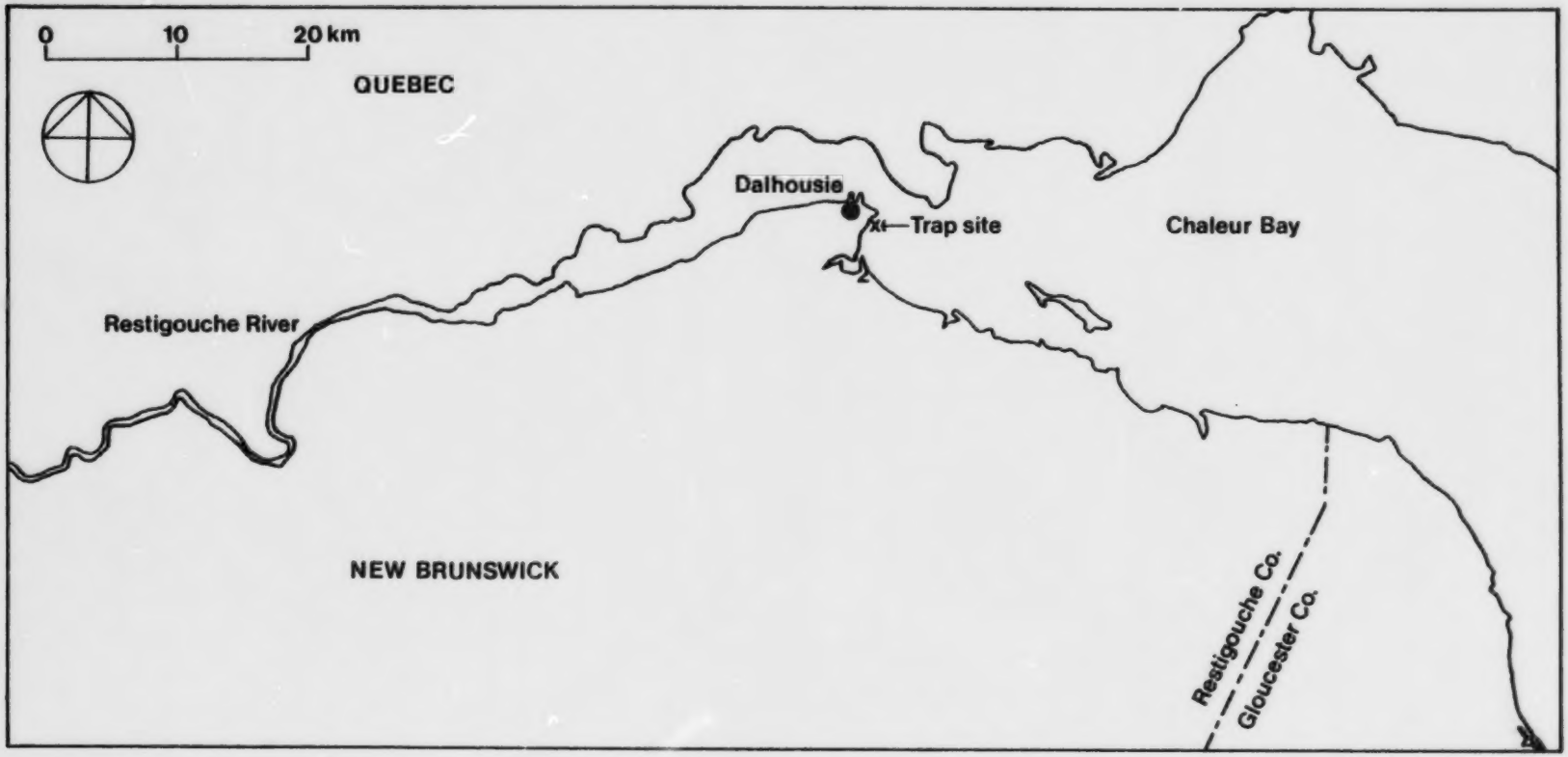

FIG. Location map of adult salmon trapping site, Restigouche River, 1972-80.

TABLE 1. Percentage composition of sea ages of large salmon caught during successive semi-monthly periods, over the two seasons of sampling, 1979-80.

Semi-monthly period	Percent of sample						Total number in sample	
	Maiden fish							
	Sea-age - 2 yr		Sea age - 3 yr		Previous spawners			
	1979	1980	1979	1980	1979	1980	1979	1980
May 16-31	-	-	66.7	-	33.9	-	3	-
Jun 1-15	16.7	51.1	61.1	35.6	22.2	13.3	36	45
16-30	50.7	79.3	38.7	10.7	10.7	9.9	75	121
Jul 1-15	69.0	86.3	24.1	7.5	6.9	6.3	29	80
16-31	50.0	75.0	50.0	-	-	25.0	18	4
Aug 1-15	100.0	100.0	-	-	-	-	1	1
Overall	45.7	76.5	42.6	13.9	11.7	9.6	162	251

TABLE 2. Percentage composition of freshwater (smolt) ages in each sea-age group of large salmon over the two seasons of sampling, 1979-80.

Sea age (yr)	Percent of sample						Total number in sample	
	Smolt age - 2 yr		Smolt age - 3 yr		Smolt age - 4 yr			
	1979	1980	1979	1980	1979	1980	1979	1980
1	50.0	-	50.0	100.0	-	-	2	3
2	15.3	9.7	75.3	82.1	9.4	8.2	85	207
3	8.0	14.6	89.3	56.1	2.7	29.3	75	41
Overall	12.4	10.4	81.5	78.1	6.2	11.6	162	251

TABLE 3. Age composition (age structure) of large salmon over the two seasons of sampling, 1979-80.

Age structure	Percent of sample		Total number in sample	
	1979	1980	1979	1980
2.2	4.9	7.2	8	18
2.3	3.1	1.6	5	4
2.4	2.5	-	4	-
2.5	1.9	0.8	3	2
2.6	-	0.8	-	2
3.2	36.4	63.0	59	158
3.3	38.9	8.4	63	21
3.4	3.1	5.2	5	13
3.5	3.1	1.2	5	3
3.6	-	0.4	-	1
4.2	4.3	6.8	7	17
4.3	1.2	4.4	2	11
4.4	0.6	-	1	-
4.5	-	0.4	-	1
Overall	100.0	100.0	162	251

TABLE 4. Age composition (total age in years) of large salmon over the two seasons of sampling, 1979-80.

Total age (yr)	Percent of sample		Total number in sample		From spawning of	
	1979	1980	1979	1980	1979	1980
4	4.9	7.2	8	18	1974	1975
5	39.5	64.5	64	162	1973	1974
6	45.7	15.1	74	38	1972	1973
7	6.2	10.4	10	26	1971	1972
8	3.7	2.0	6	5	1970	1971
9	-	0.8	-	2	-	1970
Overall	100.0	100.0	162	251	-	-

TABLE 5. Percentage composition of freshwater (smolt) ages in grilse over the two seasons of sampling, 1979-80.

Sea age (yr)	Percent of sample						Total number in sample	
	Smolt age - 2 yr		Smolt age - 3 yr		Smolt age - 4 yr			
	1979	1980	1979	1980	1979	1980	1979	1980
1	13.1	15.7	84.8	77.7	2.1	6.6	282	121
Overall	13.1	15.7	84.8	77.7	2.1	6.6	282	121

TABLE 6. Age composition (structure and total age in years) of grilse over the two seasons of sampling, 1979-80.

Age structure	Total age (yr)	Percent of sample		Total number in sample		From spawning of	
		1979	1980	1979	1980	1979	1980
2.1	3	13.1	15.7	37	19	1975	1976
3.1	4	84.8	77.7	239	94	1974	1975
4.1	5	2.1	6.6	6	8	1973	1974
Overall		100.0	100.0	282	121	-	-

TABLE 7. Percentage previous spawners of total season sample (large salmon) over the nine seasons of sampling, 1972-80.

Year	Percent previous spawners	Total season sample (large salmon)
1972	2.6	667
1973	2.3	694
1974	3.8	718
1975	5.3	1,181
1976	6.8	916
1977	5.3	608
1978	4.3	370
1979	11.7	162
1980	9.6	251
Overall	4.9	5,567

TABLE 8. Percentages of total season sample of previously spawned large salmon caught during successive semi-monthly periods, over the five seasons of sampling, 1972-76.

Semi-monthly period	Percent of sample					Total number in sample				
	1972	1973	1974	1975	1976	1972	1973	1974	1975	1976
May 16-31	-	-	-	4.8	-	-	-	-	3	-
Jun 1-15	11.8	50.0	51.9	35.5	38.7	2	8	14	22	24
16-30	76.5	43.8	29.6	27.4	38.7	13	7	8	17	24
Jul 1-15	11.8	6.3	14.8	25.8	17.7	2	1	4	16	11
16-31	-	-	3.7	4.8	4.8	-	-	1	3	3
Aug 1-15	-	-	-	1.6	-	-	-	-	1	-
Overall	100.0	100.0	100.0	100.0	100.0	17	16	27	62	62

TABLE 9. Percentages of total season sample of previously spawned large salmon caught during successive semi-monthly periods, over the four seasons of sampling, 1977-80.

Semi-monthly period	Percent of sample				Total number in sample			
	1977	1978	1979	1980	1977	1978	1979	1980
May 1-15	6.3	-	5.3	-	2	-	1	-
Jun 1-15	43.8	56.3	42.1	25.0	14	9	8	6
16-30	37.5	31.3	42.1	50.0	12	5	8	12
Jul 1-15	6.3	12.5	10.5	20.8	2	2	2	5
16-31	6.3	-	-	4.2	2	-	-	1
Overall	100.0	100.0	100.0	100.0	32	16	19	24

TABLE 10. Percentage composition of freshwater (smolt) ages in each sea-age group of previously spawned large salmon over the three seasons of sampling, 1972-74.

Sea age (yr)	Percent of sample									Total number in sample		
	Smolt age - 2 yr			Smolt age - 3 yr			Smolt age - 4 yr					
	1972	1973	1974	1972	1973	1974	1972	1973	1974	1972	1973	1974
1	33.3	40.0	50.0	66.7	60.0	33.3	-	-	16.7	6	5	6
2	50.0	25.0	11.1	33.3	75.0	88.9	16.7	-	-	6	4	9
3	-	14.3	16.7	100.0	71.4	83.3	-	14.3	-	4	7	12
Overall	31.3	25.0	22.2	62.5	68.8	74.1	6.3	6.3	3.7	16	16	27

TABLE 11. Percentage composition of freshwater (smolt) ages in each sea-age group of previously spawned large salmon over the three seasons of sampling, 1975-77.

Sea age (yr)	Percent of sample									Total number in sample		
	Smolt age - 2 yr			Smolt age - 3 yr			Smolt age - 4 yr					
	1975	1976	1977	1975	1976	1977	1975	1976	1977	1975	1976	1977
1	55.0	33.3	-	35.0	55.6	100.0	10.0	11.1	-	20	9	6
2	11.1	48.8	15.4	83.3	46.3	84.6	5.6	4.9	-	18	41	13
3	26.1	25.0	45.5	69.6	75.0	36.4	4.4	-	18.2	23	12	11
Overall	31.2	41.9	23.3	62.3	53.2	70.0	6.6	4.8	6.7	61	62	30

TABLE 12. Percentage composition of freshwater (smolt) ages in each sea-age group of previously spawned large salmon over the three seasons of sampling, 1978-80.

Sea age (yr)	Percent of sample									Total number in sample		
	Smolt age - 2 yr			Smolt age - 3 yr			Smolt age - 4 yr					
	1978	1979	1980	1978	1979	1980	1978	1979	1980	1978	1979	1980
1	83.3	50.0	-	16.7	50.0	100.0	-	-	-	6	2	3
2	16.7	45.5	13.3	83.3	45.5	86.7	-	9.1	-	6	11	15
3	50.0	16.7	33.3	50.0	83.3	50.0	-	-	16.7	4	6	6
Overall	50.0	36.8	16.7	50.0	57.9	79.2	-	5.3	4.2	16	19	24

TABLE 13. Percentage composition of freshwater (smolt) ages in each sea-age group of previously spawned large salmon, according to their sea age at second previous spawning trip, over the three seasons of sampling, 1972-74.

Sea age (yr)	Percent of sample									Total number in sample		
	Smolt age - 2 yr			Smolt age - 3 yr			Smolt age - 4 yr					
	1972	1973	1974	1972	1973	1974	1972	1973	1974	1972	1973	1974
4	-	100.0	-	100.0	-	-	-	-	-	1	1	-
5	-	-	-	-	100.0	-	-	-	-	-	1	-
Overall	-	50.0	-	100.0	50.0	-	-	-	-	1	2	-

TABLE 14. Percentage composition of freshwater (smolt) ages in each sea-age group of previously spawned large salmon according to their sea age at second previous spawning trip, over the three seasons of sampling, 1975-77.

Sea age (yr)	Percent of sample									Total number in sample		
	Smolt age - 2 yr			Smolt age - 3 yr			Smolt age - 4 yr					
	1975	1976	1977	1975	1976	1977	1975	1976	1977	1975	1976	1977
3	-	-	-	100.0	100.0	-	-	-	-	1	1	-
4	-	50.0	-	100.0	50.0	100.0	-	-	-	1	2	1
5	33.3	-	-	66.7	100.0	100.0	-	-	-	3	1	1
Overall	20.0	25.0	-	80.0	75.0	100.0	-	-	-	5	4	2

TABLE 15. Percentage composition of freshwater (smolt) ages in each sea-age group of previously spawned large salmon according to their sea age at second previous spawning trip, over the three seasons of sampling, 1978-80.

Sea age (yr)	Percent of sample									Total number in sample		
	Smolt age - 2 yr			Smolt age - 3 yr			Smolt age - 4 yr					
	1978	1979	1980	1978	1979	1980	1978	1979	1980	1978	1979	1980
3	-	100.0	-	-	-	100.0	-	-	-	-	1	1
4	100.0	100.0	66.7	-	-	33.3	-	-	-	1	1	3
5	100.0	-	-	-	-	-	-	-	-	1	-	-
Overall	100.0	100.0	50.0	-	-	50.0	-	-	-	2	2	4

TABLE 16. Percentage composition of freshwater (smolt) ages in each sea-age group of previously spawned large salmon according to their sea age at third previous spawning trip, over the three seasons of sampling, 1972-74.

Sea age (yr)	Percent of sample									Total number in sample		
	Smolt age - 2 yr			Smolt age - 3 yr			Smolt age - 4 yr					
	1972	1973	1974	1972	1973	1974	1972	1973	1974	1972	1973	1974
6	-	-	-	100.0	-	-	-	-	-	1	-	-
Overall	-	-	-	100.0	-	-	-	-	-	1	-	-

TABLE 17. Percentage composition of freshwater (smolt) ages in each sea-age group of previously spawned large salmon, according to their sea age at third previous spawning trip, over the three seasons of sampling, 1975-77.

Sea age (yr)	Percent of sample									Total number in sample		
	Smolt age - 2 yr			Smolt age - 3 yr			Smolt age - 4 yr					
	1975	1976	1977	1975	1976	1977	1975	1976	1977	1975	1976	1977
6	-	100.0	-	-	-	-	-	-	-	-	1	-
7	-	-	-	100.0	-	-	-	-	-	1	-	-
Overall	-	100.0	-	100.0	-	-	-	-	-	1	1	-

N.B. No previously spawned large salmon possessed three previous spawning marks over the three seasons of sampling, 1978-80.

TABLE 18. Age composition (age structure) of previously spawned large salmon over the five seasons of sampling, 1972-76.

Age structure	Percent of sample					Total number in sample				
	1972	1973	1974	1975	1976	1972	1973	1974	1975	1976
2.2,1	-	-	3.7	1.6	1.6	-	-	1	1	1
2.3,1	12.5	12.5	7.4	16.4	3.2	2	2	2	10	2
2.3,2	-	-	-	-	1.6	-	-	-	-	1
2.4,2	18.8	-	3.7	3.3	29.0	3	-	1	2	18
2.4,3	-	-	-	-	1.6	-	-	-	-	1
2.5,3	-	6.3	7.4	8.2	3.2	-	1	2	5	2
2.6,2,4	-	6.3	-	-	-	-	1	-	-	-
2.7,3,5	-	-	-	1.6	-	-	-	-	1	-
2.8,2,4,6	-	-	-	-	1.6	-	-	-	-	1
3.2,1	-	-	-	1.6	-	-	-	-	1	-
3.3,1	25.0	18.8	7.4	9.8	6.5	4	3	2	6	4
3.4,2	6.3	18.8	29.6	21.3	29.0	1	3	8	13	18
3.5,1,3	-	-	-	-	1.6	-	-	-	-	1
3.5,2,3	-	-	-	1.6	-	-	-	-	1	-
3.5,2,4	-	-	-	1.6	1.6	-	-	-	1	1
3.5,3	25.0	25.0	37.0	23.0	12.9	4	4	10	14	8
3.6,3,5	-	-	-	1.6	-	-	-	-	1	-
3.7,3,5	-	6.3	-	-	1.6	-	1	-	-	1
3.8,2,4,6	6.3	-	-	-	-	1	-	-	-	-
3.9,3,5,7	-	-	-	1.6	-	-	-	-	1	-
4.2,1	-	-	-	3.3	-	-	-	-	2	-
4.3,1	-	-	3.7	-	1.6	-	-	1	-	1
4.4,2	6.3	-	-	1.6	3.2	1	-	-	1	2
4.5,3	-	6.3	-	1.6	-	-	1	-	1	-
Overall	100.0	100.0	100.0	100.0	100.0	16	16	27	61	62

TABLE 19. Age composition (age structure) of previously spawned large salmon over the four seasons of sampling, 1977-80.

Age structure	Percent of sample				Total number in sample			
	1977	1978	1979	1980	1977	1978	1979	1980
2.3,1	-	31.3	-	-	-	5	-	-
2.4,2	6.7	-	21.1	-	2	-	4	-
2.5,1,3	-	-	5.3	-	-	-	1	-
2.5,2,4	-	-	5.3	-	-	-	1	-
2.5,3	16.7	6.3	5.3	8.3	5	1	1	2
2.6,2,4	-	6.3	-	8.3	-	1	-	2
2.7,3,5	-	6.3	-	-	-	1	-	-
3.2,1	-	-	-	4.2	-	-	-	1
3.3,1	20.0	6.3	5.3	4.2	6	1	1	1
3.4,2	33.3	31.3	26.3	54.2	10	5	5	13
3.4,3	3.3	-	-	-	1	-	-	-
3.5,1,3	-	-	-	4.2	-	-	-	1
3.5,3	6.7	12.5	26.3	8.3	2	2	5	2
3.6,2,4	3.3	-	-	-	1	-	-	-
3.6,3,4	-	-	-	4.2	-	-	-	1
3.7,3,5	3.3	-	-	-	1	-	-	-
4.4,2	-	-	5.3	-	-	-	1	-
4.5,3	6.7	-	-	4.2	2	-	-	1
Overall	100.0	100.0	100.0	100.0	30	16	19	24

TABLE 20. Age composition (total age in years) of previously spawned large salmon over the three seasons of sampling, 1972-74.

Total age (yr)	Percent of sample			Total number in sample			From spawning of		
	1972	1973	1974	1972	1973	1974	1972	1973	1974
4	-	-	3.7	-	-	1	-	-	1969
5	12.5	12.5	7.4	2	2	2	1966	1967	1968
6	43.8	18.8	11.1	7	3	3	1965	1966	1967
7	6.3	25.0	40.7	1	4	11	1964	1965	1966
8	31.3	31.3	37.0	5	5	10	1963	1964	1965
9	-	6.3	-	-	1	-	-	1963	-
10	-	6.3	-	-	1	-	-	1962	-
11	6.3	-	-	1	-	-	1960	-	-
Overall	100.0	100.0	100.0	16	16	27	-	-	-

TABLE 21. Age composition (total age in years) of previously spawned large salmon over the three seasons of sampling, 1975-77.

Total age (yr)	Percent of sample			Total number in sample			From spawning of		
	1975	1976	1977	1975	1976	1977	1975	1976	1977
4	1.6	1.6	-	1	1	-	1970	1971	-
5	18.0	4.8	-	11	3	-	1969	1970	-
6	16.4	37.1	26.7	10	23	8	1968	1969	1970
7	29.5	33.9	53.3	18	21	16	1967	1968	1969
8	27.9	19.4	6.7	17	12	2	1966	1967	1968
9	4.9	-	10.0	3	-	3	1965	-	1967
10	-	3.2	3.3	-	2	1	-	1965	1966
12	1.6	-	-	1	-	-	1962	-	-
Overall	100.0	100.0	100.0	61	62	30	-	-	-

TABLE 22. Age composition (total age in years) of previously spawned large salmon over the three seasons of sampling, 1978-80.

Total age (yr)	Percent of sample			Total number in sample			From spawning of		
	1978	1979	1980	1978	1979	1980	1978	1979	1980
5	31.3	-	4.2	5	-	1	1972	-	1974
6	6.3	26.3	4.2	1	5	1	1971	1972	1973
7	37.5	42.1	62.5	6	8	15	1970	1971	1972
8	18.8	31.6	20.8	3	6	5	1969	1970	1971
9	6.3	-	8.3	1	-	2	1968	-	1970
Overall	100.0	100.0	100.0	16	19	24	-	-	-

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